

EGU2020-9830

<https://doi.org/10.5194/egusphere-egu2020-9830>

EGU General Assembly 2020

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Rainfall induced-landslides and man-made landforms mapping for underground utility networks management in a mediterranean metropolitan area (Genoa, Northwest Italy)

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Extreme precipitation has become increasingly frequent in the last years in Liguria, a hilly and mountainous region in Northwest Italy. In particular, the Genoa metropolitan area is internationally known for rainfall ground effects: from the beginning of this millennium four intense flash floods have been recorded and as many rainfall-induced landslide periods with significant impacts in roads, buildings and underground utility networks.

These phenomena are also related with more than a century of urbanization that has completely changed landforms and increased the vulnerability of the area.

The research consists of preliminary study based on the production of three different maps: Landslide inventory map, Landslide susceptibility zoning map and a preliminary Man-made landform map that could help to describe better the Urban Geomorphology of Genoa metropolitan area, characterized by isolated and spread houses laying on terraced slopes mixed with high density urban area with aged decametric retaining walls.

On site monitoring, satellite interferometric data and historical maps were used to support the production of cartography work.

In a second step, the above maps were associated with underground utility networks (water and energy) categorized by age, diameter and material to know the potential failure risks induced both by geomorphological and structural factors.

Thanks to this research underground assets management is expected to be more efficient, determining priorities for actions in areas with higher risk.